DOCKET NO.: MSFT-5046
Application No.: 10/752,384
Office Action Dated: March 17, 2008

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PROCEDURE PURSUANT TO
37 CFR § 1.116

This listing of claims will replace all prior versions, and listings, of claims in the application.

Listing of Claims:

1.   (Currently Amended) A system for searching web pages comprising:

a database for storing connectivity information about the web pages; and

a processor-implemented page-grading engine associated with an approximation matrix Q',

where Q' approximates an ideal matrix Q with respect to the connectivity information; wherein:

the page-grading engine receives as input a personalization description v describing a set of preferences of a particular user from among the web pages and a set of search results from among the web pages based on a query from the user, and grades the set of search results for the user with respect to Q' and v such that v and the set of search results is applied to Q to result in a page rank for each search result in the set, sorting the set of search results by page rank, and returning the sorted set to the user; wherein

non-zero entries of a vector indicative of the personalization description v correspond at least to a ~~favorites~~ list of favorite web pages of the user as obtained from a ~~associated with a user's~~ web browser of the user; and

the page-grading engine grades the web pages as grading objects from an interconnected collection of weighted objects by approximating the matrix Q with respect to a parameter k, by computing a matrix U_k, computing a matrix V_k, computing a diagonal matrix S, and defining Q' as the matrix product $V_k S U_k^T$.

2.   (Original) The system of claim 1 wherein approximation matrix Q' is a rank-k matrix whose representation comprises a singular value decomposition comprising matrices V_k, S and U_k^T for a parameter k.

3.   (Original) The system of claim 2 wherein v is a vector and Q' times v is an optimal approximation to Q times v over all rank-k matrices.

4.   (Currently Amended) The system of claim 1 wherein the page-grading engine grades the web pages as A method of grading objects from an interconnected collection of weighted objects, the weights of the objects described by a description v, and the interconnection of the objects described by a description P, the page-grading engine method comprising:

        applying a grading function Q ' to the description v for the objects to determine a set of grades for the objects;

        assigning at least one object the corresponding determined grade for that object; wherein the grading function Q' approximates an ideal grading function Q, wherein non-zero entries of a vector indicative of the personalization description v correspond at least to a favorites list associated with a user's web browser and wherein applying ideal grading function Q to the description v produces ideal grades with respect to description P for every object in the interconnected collection of weighted objects; and

        rendering an indication of at least one graded object.

5.   (Currently Amended) The method system of claim 4 wherein P, Q, and Q' are matrices, v is a vector, and the approximation is a low-rank optimal approximation.

6.   (Currently Amended) The method system of claim 5 wherein entry P[i,j] in matrix P represents the probability of reaching one object i from another object j in one step of a random walk among the weighted objects.

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7.   (Currently Amended) The ~~method~~ system of claim 6 wherein at each step of the random walk there is a fixed probability c that the walk will reset, and that the random walk then continues from object a with probability v[a].

8.   (Currently Amended) The ~~method~~ system of claim 7 wherein the ideal grade of an object b is the probability of arriving at object b at a step of the random walk.

9.   (Canceled)

10.   (Currently Amended) ~~A method of grading objects from an interconnected collection of weighted objects by approximating a matrix Q with respect to a parameter k, comprising:~~

~~computing a matrix U_k;~~

~~computing a matrix V_k;~~

~~computing a diagonal matrix S;~~

~~defining the approximation to Q as the matrix product $V_k S U_k^T$; and~~

The system of claim 1 wherein:

the page-grading engine further determines ~~determining~~ a grade for at least one of the objects using Q' ~~the approximation to Q~~; wherein the weights of the objects are described by a vector v, ~~wherein~~ and

non-zero entries of the vector v correspond at least to a favorites list associated with a user's web browser, the interconnection of the objects is described by a matrix P, and the ideal grade of object i with respect to matrix P equals Q[i] times v where Q[i] is the ith row of an ideal matrix Q.

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11. (Currently Amended) The ~~method~~ system of claim 10 further comprising:

choosing a sufficiently large parameter d; and

computing an intermediate matrix M with respect to P; wherein matrix U_k,, comprises the k principal eigenvectors of $dI - MM^T$ and matrix V_k comprises the k principal eigenvectors of $dI - M^T M$, and wherein matrix $S = (dI - D)^{-\frac{1}{2}}$, where D is the diagonal matrix comprising the k eigenvalues corresponding to the k principal eigenvectors of $dI - MM^T$.

12. (Currently Amended) The ~~method~~ system of claim 11 wherein computing an intermediate matrix M with respect to P is further with respect to a constant c.

13 (Currently Amended) <u>The system of claim 1 wherein the page-grading engine grades the web pages as</u> ~~A system for grading~~ objects from an interconnected collection of weighted objects<u>, the page-grading engine</u> comprising:

a description v of the weights of the objects, wherein non-zero entries of a vector indicative of the description v correspond at least to a favorites list associated with a user's web browser;

a description P of the interconnection of the objects; and

a processor ~~comprising an object-grading engine~~ for approximating an ideal grading function Q with an approximate function Q', where applying ideal grading function Q to the description v produces ideal grades with respect to description P for every object in the interconnected collection of weighted objects, and for assigning at least one object the grade produced for that object by an application of Q' to v.

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14.   (Original) The system of claim 13 further comprising a search engine in connection with the object-grading engine, wherein the object-grading engine grades objects passed from the search engine.

15-19 (Canceled)